FY 2001 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 2000

BUDGET ACTIVITY: 2

PROGRAM ELEMENT: 0602805N
PROGRAM ELEMENT TITLE: Dual Use Science and Technology Program

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1999 ACTUAL	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Dual Use Science and Technology Program	8,539	9,945	10,067	10,218	10,409	10,622	10,837	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The mission of the Dual Use Science and Technology (DUS&T) Program is to prototype and demonstrate new approaches for leveraging commercial research, technology, products, and processes for military benefit. These new approaches to working with industry, many of which were prototyped at DARPA, must become common throughout the Navy in order to take full advantage of the technological dynamism of the commercial sector. While acquisition reform has helped clear the path, and experience has shown leveraging can work; it has also shown that leveraging is still unfamiliar and not widely adopted. The challenge is to spread leveraging of the commercial sector into the Navy and make it a normal way of doing business throughout the entire acquisition spectrum. Specifically, DUS&T encourages the Navy to leverage commercial research and development to improve the performance, cost and/or readiness of military systems. Under this effort, the Navy solicits, evaluates, ranks, and nominates dual use S&T projects for Dual Use S&T funds. Each project is 50% cost shared with industry. 25% is cost shared with the Navy project funds and Dual Use S&T provides the remaining 25%. All projects are awarded using either Cooperative Agreements or Other Transactions. This is essentially learning by doing approach to Dual Use S&T in the Navy, with Dual Use S&T funds providing an incentive.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under APPLIED RESEARCH because it investigates technological advances with possible applications toward solution of specific Naval problems, short of a major development effort.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

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2. (U) FY 1999 ACCOMPLISHMENTS:
(U) Below are the various areas of interest for this program with the individual awards topics following:

(U) Affordable Sensor Technology - Develop the sensor hardware, software, and system architecture needed to meet the needs and lower cost of Naval and commercial systems. Sensor technologies included are acoustic sensor arrays, electric/magnetic field sensors, seismic sensors, radiowave frequency sensors, electro-optic/infrared sensors, laser radars, sensor fusion, and location/navigation sensors. Initiated following awards:

- qualification of Ausform finishing Process for the Manufacturing of Aerospace Gearing.
- very large two-color 'water fused' IR array technology.
- 100 W, 4-20 GHz AIGaN/SiC Modulation Doped Field Effect Transistor Amplifier Development.
- optical correlator.
- seafloor cable burial systems for small diameter fiber-optic cable.

(U) Sustainment - Develop robust and reliable designs, parts obsolescence decision tools and simulation models, and advanced industrial sustainment practices capable of fully supporting Naval weapon and commercial system life cycle requirements. These requirements include low-cost, low volume manufacturing, shorter time to low risk production and cost-effective support; rapid quality repair and remanufacturing throughput; and increased readiness support. Initiated following awards:

- reduced cost manufacturing for blade disks.
- power electronics teaching factory.
- teaching factory for Advanced Turbine Engine Welding and Inspection Processes.
- resin injection recirculation molding of large components: process optimization and processing-structure-property relations.

(U) Fuel Efficiency and Advanced Propulsion Technology - Develop technologies for the total propulsion system for increased and efficient speed and thrust, reduced amounts of fuel and power requited and reduced emissions. Aspects include power electronic building blocks. Initiated following awards:

- development and demonstration of a standard cell approach to power electronic building blocks.
- very high power PEBB demonstration.
- advanced propulsion technology-hydrogen dense fuels stabilized aluminum hydride or alane.
- development of a high density, high efficiency, advanced programmable point-of-use power supply.
- modular power building block for multifunctional aircraft/shipboard avionics and radar power applications.
- multi-function, low weight, and compact power convertors for aircraft power system applications.

(U) Advanced High Speed Vessels and Structural Systems for Large Sea-Based Structures - This focus area addresses those requirements needed by the Navy and commercial sector to build high performance and yet affordable platforms over the life cycle. Technologies of particular interest include: high speed and excellent seakeeping vessels, structural health monitoring systems for large sea-based structures, control of large structural systems, and reliability of composite structures. Initiated following awards:

- advanced slender hull development.
- a comprehensive assessment of the hydrofoil concept for fast ships.
- application to improved design tools to demonstration craft incorporating hybrid hydrofoil and integrated propulsion technologies which are scalable to large, high-speed ships.
- surface effective vessel.
- open system architecture – condition based monitoring.

(U) Information Systems & Technology - Develop information technologies that improve the capability of both Navy command and control, and commercial communications and awareness. Areas of research include intelligent information systems, communication systems, information fusion, and collaborative environment development. Initiated following awards:

- a secure, covert, survivable network for wideband tactical communications.
- seafloor cable burial system for small diameter fiber-optic cable.

3. (U) FY 2000 PLAN:

FY 2001 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 2000

BUDGET ACTIVITY: 2 PROGRAM ELEMENT: 0602805N
PROGRAM ELEMENT TITLE: Dual Use Science and Technology Program

(U) Selected topics address Navy needs identified in the Science and Technology Requirements Guide and Navy projects will be expected to provide at least 25% of the total proposed effort with industry providing at least 50%. Below are the various areas of interest for this program with the individual awards topics following:

(U) Affordable Sensor Technology - Develop the sensor hardware, software, and system architecture needed to meet the needs and lower cost of Naval and commercial systems. Sensor technologies included are acoustic sensor arrays, electric/magnetic field sensors, seismic sensors, radiowave frequency sensors, electro-optic/infrared sensors, laser radars, sensor fusion, and location/navigation sensors. The following are planned awards:

- linear wide-band vacuum electronic power amplifier.
- development and validation of multi-frequency design codes for linear high power amplifiers.
- high power silicon carbide transmitter.
- affordable modular digital receiver.
- low defect density GaN Substrates from GaN Boules.
- phased array weather radar technology.
- ferrites for radar applications.

(U) Sustainment - Develop robust and reliable designs, parts obsolescence decision tools and simulation models, and advanced industrial sustainment practices capable of fully supporting Naval weapon and commercial system life cycle requirements. These requirements include low-cost, low volume manufacturing, shorter time to low risk production and cost-effective support; rapid quality repair and remanufacturing throughput; and increased readiness support. The following are planned awards:

- solid state pseudo-hydraulic systems for naval desk operations.
- high rate fiber placement for affordable composite structures.
- friction stir welding technology commercialization for high strength structural alloys.
- scaled-up production of nanostructured ceramic powders.
- thermal barrier coatings for molybdenum refractory alloys.
- integrated engine prognostics and health-management system.
- reconfigurable control and fault indentification system.

(U) Advanced Propulsion, Power and Fuel Efficiency Technology - Develop technologies for the total propulsion system for increased and efficient speed and thrust, reduced amounts of fuel and power required and reduced emissions. Aspects include power electronic building blocks, turbine engine propulsion, aircraft power distribution and storage. The following are planned awards:

- active control of combustion processes.
- magnetostrictive actuators for marine propeller pitch and flow control.
- metal matrix composite reinforced magnetic thrust disk.
- robust, high-DN bearing.
- turbine engine propulsion.
- nickel-metal hydride aircraft battery.

(U) Information Systems & Technology - Develop information technologies that improve the capability of both Navy command and control, and commercial communications and awareness. Areas of research include intelligent information systems, communication systems, information fusion, and collaborative environment development. The following are planned awards:

- a system for distributed registration for mobile augmented reality in urban environment.
- k/ka-band phased array antennas for mobile platforms.

(U) Bioengineering and Medical Technologies - Develop technologies to improve areas of Automatic Pattern Recognition-Neural model-based sensor/processor networks for dynamic scene assessment, target detection/classification, and machinery fault diagnosis and Biorobotics-Biomimetic, Autonomous Vehicles and Mobile Robots. The following are planned awards:

- Intelligent Inference Systems bio-bots.
- simulation based intelligent tutoring for maintenance.

4. (U) FY 2001 PLAN:

FY 2001 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 2000

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(U) ONR issued a call to Navy activities in November 1998 for FY 2000 and 2001 topics to be included in a single Joint Army, Navy, and Air Force solicitation to industry for dual use S&T proposals. Selected topics will address Navy needs identified in the Science and Technology Requirements Guide and Navy projects will be expected to provide at least 25% of the total proposed effort with industry providing at least 50%. The FY 2000/2001 solicitation was issued in January 1999. An additional Joint solicitation for FY 2001 proposals will be issued in January 2000. Agreements for FY 2001 will be awarded in October 2000. Topic areas include:

(U) Affordable Sensor Technology **-** Develop the sensor hardware, software, and system architecture needed to meet the needs and lower cost of Naval and commercial systems. Sensor technologies included are acoustic sensor arrays, electric/magnetic field sensors, seismic sensors, radiowave frequency sensors, electro-optic/infrared sensors, laser radars, sensor fusion, and location/navigation sensors.

(U) Sustainment **-** Develop robust and reliable designs, parts obsolescence decision tools and simulation models, and advanced industrial sustainment practices capable of fully supporting Naval weapon and commercial system life cycle requirements. These requirements include low-cost, low volume manufacturing, shorter time to low risk production and cost-effective support; rapid quality repair and remanufacturing throughput; and increased readiness support.

(U) Distributed Mission Training - Develop network of training assets, including live, simulated and computer-generation, which allows multiple players at multiple sites to engage in complex, scalable and tailorable synthetic training environments that mirror the real, modern battlefield. Including Interconnection technology, Information technology, Representation technology, and Pervasive technologies.

(U) Advanced Propulsion, Power and Fuel Efficiency Technology - Develop technologies for the total propulsion system for increased and efficient speed and thrust, reduced amounts of fuel and power required and reduced emissions. Aspects include power electronic building blocks, turbine engine propulsion, aircraft power distribution and storage.

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(U) High Speed Ships - Conceptualize, analyze, and demonstrate the feasibility of high speed ships for both commercial and military transport. The broad goals at full scale are: speeds in excess of 70 knots, ranges in excess of 6,000 miles, payload (cargo) in excess of 5,000 tons, shallow draft for small port entry, offloading under adverse weather conditions, and reasonable power requirements.

(U) Information Systems & Technology - Develop information technologies that improve the capability of both Navy command and control, and commercial communications and awareness. Areas of research include intelligent information systems, communication systems, information fusion, and collaborative environment development.

(U) Bioengineering and Medical Technologies - Develop technologies to improve areas of Automatic Pattern Recognition-Neural model-based sensor/processor networks for dynamic scene assessment, target detection/classification, and machinery fault diagnosis and Biorobotics-Biomimetic, Autonomous Vehicles and Mobile Robots.

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B. (U) PROGRAM CHANGE SUMMARY:

	FY 1999	FY 2000	FY 2001
(U) FY 2000 President's Budget:	9,977	18,390	18,126
(U) Appropriated Value:	-	10,000	-
(U) SBIR/STTR Transfers:	-274	-	-
(U) Program Adjustments:	-	-	518
(U) Outsourcing Adjustments:	-	-	182
(U) Execution Adjustments:	-1,119	-	-
(U) Congressional Rescissions:	-	-55	-
(U) Congressional Reduction:	-	-8,390	-
(U) Various Rate Adjustments:	-45	-	-8,759
(U) FY 2001 PRESBUDG Submission:	8,539	9,945	10,067

(U) CHANGE SUMMARY EXPLANATION:

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:
(U) PE 0602805A (Dual Use Applications Program)
(U) PE 0602805F (Dual Use Science and Technology Program)

D. (U) SCHEDULE PROFILE: Not applicable.